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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

MAR 2005

Applicant's or agent's file reference 027830-4515	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US 03/34700	International filing date *(day/month/year)* 31.10.2003	Priority date *(day/month/year)* 07.11.2002
International Patent Classification (IPC) or both national classification and IPC B62D25/06		
Applicant JOHNSON CONTROLS TECHNOLOGY COMPANY et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
03.06.2004	09.11.2004
Name and mailing address of the international preliminary examining authority: European Patent Office - Gitschiner Str. 103 D-10958 Berlin Tel. +49 30 25901 - 0 Fax: +49 30 25901 - 840	Authorized Officer Wisnicki, M Telephone No. +49 30 25901-538

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US 03/34700

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-14 as originally filed

Claims, Numbers

1-31 filed with telefax on 22.09.2004

Drawings, Sheets

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:

   ☐ the claims, Nos.:

   ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-31
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-20, 22-26
	No:	Claims	21, 27-31
Industrial applicability (IA)	Yes:	Claims	1-31
	No:	Claims	

2. Citations and explanations

   see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Reference is made to the following documents:

D1: DE-A-38 35 560
D2: EP-A-1 138 536
D3: US-A-3 427 068

2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 21, 27, 28 does not involve an inventive step in the sense of Article 33(3) PCT.

2.1 With respect to claim 21 document D1 discloses (column 1, lines 46-64; figure 1):

A structural roof system for a vehicle comprising an exterior class A roof panel (6), a structural layer (1) having a plurality of predetermined locations (2) adapted to receive overhead components, a headliner extending across and being attached to the structural layer on a side thereof spaced from the roof panel, a plurality of overhead components (5) attached to the structural layer at the predetermined locations, and wherein a substantial portion of the strength of the roof system is provided by the structural layer.

The subject-matter of claim 21 differs from D1 in that the structural layer is integrally formed with the roof panel.

This feature, however, comes within the scope of the customary practice followed by persons skilled in the art (see e.g. D2, column 2, lines 13-23, figure 1), especially as the advantages thus achieved can readily be foreseen. Hence, no inventive step is present in the subject-matter of claim 21.

2.2 With respect to claim 27 document D3 discloses (column 2, lines 38-44; figures 1-3):

A modular structural roof system for attachment to a main body of the vehicle, the roof system comprising an exterior roof panel (12), a structural member (16) coupled to the roof panel, at least one of an A-pillar, a B-pillar and a C-pillar coupled to the structural member, the roof system including at least one preinstalled belt-line-up

component (50) or system formed as a part of the roof,

from which the subject-matter of claim 27 differs in that the roof system comprises a headliner spaced from the roof panel and a plurality of preinstalled overhead components.

However, these features have already been employed for the same purpose in a similar roof system, see document D1, column 1, lines 46-64; figures 1, 2. It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to a roof system according to document D3, thereby arriving at a roof system according to claim 27. Consequently, no inventive step is present in the subject-matter of claim 27.

2.3 The feature of claim 28 (the belt-line-up components selected from the group consisting of pillars, windshields, wipers, package shelves, cowling, seals, occupant retention systems, side rails or cross-car rails) is also known from D1 (figures 1-3). Hence, no inventive step is present in the subject-matter of claim 28.

2.4 In claims 29-31 a slight constructional change in the roof system of claim 27 is defined which comes within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen. Consequently, the subject-matter of claims 29-31 also lacks an inventive step.

3 Claims 1-20 and 22-26 are considered to be novel and inventive for following reasons:

3.1 Document D1, which is considered to represent the most relevant state of the art, discloses:

A structural roof system for a vehicle comprising:
a roof panel;
a structural element coupled to the roof panel and adapted to receive at least one overhead component; and
a headliner coupled to the structural element, wherein the structural element provides a substantial portion of the structural capability of the roof system,

from which the subject-matter of claim 1 differs in that the structural element comprises a plurality of predetermined removable areas adapted to receive at least

one overhead component.

The subject-matter of claim 1 is therefore novel (Article 33(2) PCT).

The problem to be solved by the present invention may therefore be regarded as to improve the arrangement of the roof system.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

The combination of the features of claim 1 is not rendered obvious by the available prior art. Therefore the skilled person would not find any indications to solve the problem in the way proposed in the present application.

3.2 Claims 2-20 are dependent on claim 20 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

3.3 The feature of depending claim 22 which differs from D1 is that the structural element comprises a plurality of predetermined removable areas adapted to receive at least one overhead component. For reasoning see point 3.1 above.

3.4 With respect to claim 23 document D1 discloses:

A structural roof system for a vehicle comprising:
a roof panel;
a superstructure adapted to receive overhead components;
the superstructure having a first and a second side, the roof panel being attached to the first side;
a headliner extending across and being attached to the second side of the superstructure: and
a plurality of overhead components attached to the superstructure, and wherein a substantial portion of the structural strength of the roof system is provided by the superstructure,

from which the subject-matter of claim 23 differs in that the superstructure comprises a plurality of preformed receptacles at predetermined locations adapted to receive overhead components, wherein a plurality of overhead components attached through

the headliner to the receptacles.

The subject-matter of claim 23 is therefore novel (Article 33(2) PCT).

The problem to be solved by the present invention may therefore be regarded as to improve the arrangement of the roof system.

The solution to this problem proposed in claim 23 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

The combination of the features of claim 23 is not rendered obvious by the available prior art. Therefore the skilled person would not find any indications to solve the problem in the way proposed in the present application.

3.5 Claims 24-26 are dependent on claim 23 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Claims:

(42)

1. A structural roof system for a vehicle comprising:

a roof panel;

a structural element coupled to the roof panel and having a plurality of predetermined removable areas adapted to receive at least one overhead component; and

a headliner coupled to the structural element, wherein the structural element provides a substantial portion of the structural capability of the roof system.

2. The structural roof system of Claim 1, wherein the roof panel and structural element are integrally formed.

3. The structural roof system of Claim 1, wherein the roof panel is formed as a separate part from the structural element and has sufficient structural strength to withstand finishing, shipping, and assembly to the structural roof system.

4. The structural roof system of Claim 1, wherein the headliner has sufficient structural strength to withstand formation, shipping, and assembly to the structural roof system.

5. The structural roof system of Claim 1, wherein the predetermined removable areas comprise at least one of a cut-out and a knock-out and the at least one component is selected from the group consisting of lights, assist handles, hooks, airbags, antennas, a sun roof, mirrors, consoles, and motors.

6. The structural roof system of Claim 1, wherein the at least one overhead component is selected from the group consisting of wire harnesses, seals, folding canvas, T-tops, glass roof panels, HVAC vents, HVAC ducts, HVAC controls, headrests, sun protection systems, infotainment components and systems, acoustic treatments, instrumentality, navigation systems, storage components, speakers, emergency wiring systems, displays, cameras, switches, impact countermeasures, occupant detection or sensing systems, center high mount stop lights, power and signal distribution components, tools, air purification systems, bezels, close-off trim, rail components, side and/or rear view camera components.

7. The structural roof system of Claim 1 wherein the roof panel has an exterior class "a" surface.

8. The structural roof system of Claim 7, wherein the "a" surface is provided by a process selected from the group consisting of painting, e-coating, in-mold panting, in-mold coloring, or the use of films.

9. The structural roof panel of Claim 1, wherein the roof panel is formed by a process selected from groups consisting of injection molding, casting, sheet molding, reaction injection molding, lay-up, stamping, and pressing.

10. The structural roof system of Claim 1, wherein the roof panel is formed separately from the structural element and is adhered thereto using a technique selected from the group consisting of adhesives, fittings, Velcro®, snaps, clips, straps, fasteners, rivets, fusing, or welding.

11. The structural roof system of Claim 1, wherein each overhead component is attached to the structural element using a technique selected from the group consisting of adhesives, fittings, Velcro®, snaps, clips, straps, fasteners, rivets, fusing, or welding.

12. The structural roof system of Claim 1, wherein the structural element is a superstructure integrally formed with the roof panel.

13. The structural roof system of Claim 12, wherein the superstructure comprises a plurality of ribs and a plurality of locations adapted to receive overhead components.

14. The structural roof system of Claim 12 wherein the superstructure is substantially coterminous with the roof panel and includes a plurality of receptacles configured to selectively receive the overhead components.

15. The structural roof system of Claim 14 wherein at least a portion of the receptacles are removable for accommodating the overhead components within the superstructure.

16. The structural roof system of Claim 1, wherein the structural element comprises a plurality of spaced apart pods.

17. The structural roof system of Claim 16, wherein each pod includes at least one location adapted to receive an overhead component.

18. The structural roof system of Claim 16, wherein two pods are spaced apart from one another and are arranged to be located adjacent vehicle side rails when the roof system is placed on a vehicle.

19. The structural roof system of Claim 1, further including locators, adapted to facilitate attachment of the structural roof system to a vehicle during assembly.

20. The structural roof system of Claim 1, further comprising one or more belt-line-up components selected from the group consisting of windshields, pillars, a package shelf, seals, covered boxes, wipers, occupant retention systems, side rails, or front and rear cross-car rails.

21. A structural roof system for a vehicle comprising an exterior class A roof panel, a structural layer integrally formed with the roof panel, the structural layer having a plurality of predetermined locations adapted to receive overhead components, a headliner extending across and being attached to the structural layer on a side thereof spaced from the roof panel, a plurality of overhead components attached to the structural layer at the predetermined locations, and wherein a substantial portion of the structural strength of the roof system is provided by the structural layer.

22. The structural roof system of Claim 21, wherein the structural layer includes ribs and at least one of the predetermined locations comprises a structure which can be selectively removed.

23. A structural roof system for a vehicle comprising:

a roof panel;

a superstructure having a plurality of preformed receptacles at predetermined locations adapted to receive overhead components;

the superstructure having a first and a second side, the roof panel being attached to the first side;

a headliner extending across and being attached to the second side of the superstructure; and

a plurality of overhead components attached through the headliner to the receptacles of the superstructure, and wherein a substantial portion of the structural strength of the roof system is provided by the superstructure.

24. The structural roof system of Claim 23, wherein the superstructure comprises a network of supporting rails.

25. A structural roof system for a vehicle comprising a roof panel, at least two pods each having first and second sides, the pods being adapted to receive overhead components, the roof panel being attached to the first sides of the pods, a headliner extending across and being attached to the second sides of the pods, a plurality of overhead components being attached to the pods, and wherein a substantial portion of the structural strength of the roof system is provided by the pods.

26. The structural roof system of Claim 25, wherein the pods are elongate and extend in the fore and aft direction with respect to the vehicle with which the roof system will be used.

27. A modular structural roof system for attachment to a main body of a vehicle, the roof system comprising an exterior roof panel, a headliner spaced from the roof panel, a structural member located between and coupled to the headliner and roof panel, at least one of an A-pillar, a B-pillar and a C-pillar coupled to the structural member, the roof system including a plurality of preinstalled overhead components and at least one preinstalled belt-line-up component or system formed as part of the roof system.

28. The modular structural roof system of Claim 27, wherein the belt-line-up components are selected from the group consisting of pillars, windshields, wipers, package shelves, coweling, seals, occupant retention systems, side rails or cross-car rails.

29. The modular structural roof system of Claim 27, further comprising a package shelf coupled to the C-pillar.

30. The modular structural roof system of Claim 27, further comprising a front plate coupled to the A-pillar.

31. The modular structural roof system of Claim 27, further comprising locators configured to align the roof system with the main body of the vehicle.